CLAIMS

What is claimed is:

1. An apparatus for measuring blood platelet contractility, comprising:

a spherical rigid chamber having

an opening in its upper aspect;

a smaller, spherical, flexible membrane chamber placed within, concentrically and isolated from the rigid chamber creating a void space between the walls of the rigid and flexible chambers and having

an opening in its upper aspect smaller than and coaxial to the opening in the rigid chamber and

a first, attached contiguous tubular passage leading out of the flexible chamber concentrically and in perpendicular axis through the opening in the rigid chamber, creating a void space that is isolated from the void space of the flexible inner chamber;

a two-way valve attached to the distal end of the tubular passage;

a second tubular passage connected to the valve at one end and in perpendicular axis to the first passage; and

a pressure transducer connected to the other end of the second passage wherein any force exerted on the flexible chamber to alter its diameter would be measured by the pressure transducer.

2. The apparatus according to claim 1, wherein the flexible membrane is latex.

3. An apparatus for measuring blood platelet contractility, comprising:

a spherical rigid chamber having

an opening in its upper aspect;

a smaller, spherical, flexible membrane chamber placed within, concentrically and isolated from the rigid chamber creating a void space between the walls of the

rigid and flexible chambers and having

an opening in its upper aspect smaller than and coaxial to the opening in the rigid chamber and

a tubular chamber leading out of the flexible chamber concentrically and in perpendicular axis through the opening in the rigid chamber, having

both ends sealed creating a void space that is isolated from the void space of the flexible inner chamber; and

a glass capillary tubing coaxial to and longer than the tubular chamber, passing through both ends of the sealed tubular chamber, creating a continuous passage from outside of the apparatus to the void space of the inner flexible chamber.

4. The apparatus according to claim 3, wherein the distal opening of the capillary tubing is plugged.

5. The apparatus according to claim 4, wherein the plug is removable.

6. The apparatus according to claim 4, wherein the capillary tubing outside of the tubular chamber is scored to facilitate a clean break.

7. An automated system for measuring blood platelet contractility of a plurality of samples, comprising:

an array of retractometer units, each of which is

a separate apparatus for measuring blood platelet contractility, comprising:

a spherical rigid chamber having

an opening in its upper aspect;

a smaller, spherical, flexible membrane chamber placed concentrically within the rigid chamber creating a void space between the walls of the rigid and flexible chambers and having

an opening in its upper aspect smaller than and coaxial to the opening in the rigid chamber and

a first, attached contiguous tubular passage leading out of the flexible chamber concentrically and in perpendicular axis through the opening in the rigid chamber, creating a void space that is isolated from the void space of the flexible inner chamber;

a two-way valve attached to the distal end of the tubular passage;

a second tubular passage connected to the valve at one end and in perpendicular axis to the first passage; and

a common pressure transducer connected to the other end of the second passage of each separate retractometer

wherein any force exerted on the flexible chamber of each retractometer to alter its diameter would be measured by the common pressure transducer.

8. The automated system according to claim 7, wherein the valve is activated by a solenoid.

9. The automated system according to claim 7, wherein the array is connected to an electronic solenoid valve controller.

10. A system apparatus for automatically measuring platelet contractility in a plurality of samples, comprising:

a pump; mechanically connected to

a pump motor; electronically connected to

a microprocessor having a plurality of pins

a first pin to turn the pump motor on

a second pin to move fluid in the pump in one direction

a third pin to move fluid in the pump in an opposite direction and

at least one of the remainder of the plurality of pins to activate each

of an array of solenoid valves;

a voltage divider used to establish the position of the fluid in the pump;

a first fluid conduit; connecting the pump to a

a hydraulic system comprising

a first manifold; connecting the pump to each of

a plurality of retractometers each activated by one of the solenoid valves;

a second fluid conduit manifold; connecting the retractometers to a

a pressure transducer;

an analog to digital (A/D) converter connected electronically to the

tranducer, the pump motor and the microprocessor; and

a computer

wherein, a readout position voltage from the voltage divider is entered through the (A/D) converter to the microprocessor, which determines the direction of flow in the pump and activates the pump fluid pressure within the system, which pressure is then measured by the pressure transducer connected electronically to the A/D converter and a target pressure is registered in the microprocessor memory and subsequently recorded and displayed by the computer.

11. The apparatus according to claim 10, wherein the pump moves fluid with a sliding piston.

12. The apparatus according to claim 11, wherein the pump is a syringe.

13. The apparatus according to claim 10, wherein the array of solenoid valves comprises eight valves, each valve activating one of eight retractometers.

14. The apparatus according to claim 10, further comprising

a first protection valve located at the entrance to the pressure transducer to prevent damage to the system and

a second protection valve to control access to a fluid reservoir.

15. The apparatus according to claim 10, wherein the output voltage of the pressure transducer is entered into the A/D converter and subsequently to the microprocessor.

16. The apparatus according to claim 10, wherein subroutines are burnt into the microprocessor.

17. A method for measuring blood platelet contractility, comprising:

preparing a retractometer according to this invention by

applying adhesive to the surface of the inner flexible membrane to avoid slippage of clots

pressure conditioning the flexible membrane by

mounting the membrane on a rubber stopper having a needle attached to a two-way valve

attaching a syringe to one opening of the valve

attaching a second needle to a second opening of the valve, making certain that the reach of the two needles is identical;

pressurizing the membrane

closing the valve to the syringe

allowing the inner and ambient pressures to equilibrate by siphoning and

adjusting the fluid level inside the capillary to "zero pressure" level;

loading a sample into a void outside the flexible membrane;

adding a small amount of oil over the sample to avoid drying out of sample; allowing the sample to clot; and

measuring the degree of contractility in a pressure transducer.

18. A method for automatically measuring a plurality of samples to determine strength of platelet contractility, comprising:

a first step of calibrating the apparatus of claim

wherein the microprocessor reads all initial pressures in all retractometers sequentially by

opening each solenoid valve,

opening the protection valve.

measuring the voltage in the pressure transducer

storing the measured value in the temporary memory of the microprocessor.

wherein this process is repeated until all the initial pressure values are registered as target values for each of the retractometers;

a second step, wherein the value of the hydraulics is taken

opening the protection valve only

activating the pump until the target value is reached; and

a third step of

opening the sample valve

measuring the pressure

closing the sample valve

sending the measured values to a text file in a computer

wherein, the new measured value for each retractometer becomes the next target value, and

wherein step three is repeated until all samples are measured.

19. The method according to claim 17, wherein the contractility is useful in determining platelet activity.

20. The method according to claim 18, wherein the platelet activity is useful in determining viability of stored blood products.

21. The method according to claim 18, wherein the contractility is useful in diagnosis or prognosis of various diseases in patients.